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ABSTRACT

The effectiveness of positive and negative evaluative comments for children's learning was assessed in a two-choice discrimination task. Results indicate that negative comments after incorrect responses greatly facilitated learning while positive comments after correct responses had little effect. To explain the findings, a naturalistic analysis of the use of evaluative expressions in the classroom is advanced. It reveals that positive evaluations were used frequently, indiscriminately and often independently of the children's behavior. A distinctive feature of the work is its emphasis upon gains to be made from an integration of traditional experimental methods with ethological analyses of children's behavior. (Author)

ED050406

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# EXPERIMENTAL - ETHOLOGICAL STUDIES OF SOCIAL REINFORCEMENT IN CHILDREN[1]

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Recent studies of social reinforcement have questioned the often assumed universal effectiveness of evaluative comments to change children's performance. A detailed account of the conditions which determine the reinforcing effectiveness of these comments is needed to better understand the phenomenon.

Today we would like to present some of our research on social reinforcement with a special emphasis on the informational properties of the verbal stimuli. Two studies will be discussed. The first is an experimental comparison of the effects of praise and criticism on children's discrimination learning. The second study is a rather new innovation in this area; a detailed, ethological analysis of the naturalistic usage of social reinforcement.

Our first study involved first and second grade children and had 2 objectives. First, we wanted to assess the relative reinforcing effectiveness of praise and criticism with these young children. A control group receiving unfamiliar, novel words was the reference for comparisons. Our second objective was to manipulate the cue properties of the verbal events by special instructional definitions. We wanted to find out whether the specific contextual definition and use could enhance the reinforcing effectiveness of verbal stimuli. In separate groups, the verbal comments were defined as indicating either correct or incorrect responses. Thus, the overall design had 3 types of verbal outcomes, praise, criticism and novel words; and 3 types of cue functions, positive, negative and undefined.

This picture (illustration of a subject at the apparatus is not included) shows the experimental task and apparatus. The child is in front of a 2-choice push button panel. Upon illumination of the white signal light he may press either the right or left button, both of which terminate the signal light. One button was predesignated and the child's response on that button elicited the verbal event appropriate to his experimental condition. The performance measure we employed was the number of times the child pressed the button yielding the verbal event. This reflects the degree to which the child performed to obtain or avoid the comments. Let's look at the performance of the three undefined groups.

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See Figure 1

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In this histogram a mean score of 15 represents nondifferential responding to the buttons. Notice that the undefined approval group was only slightly better than chance and the novel word group. Two novel words were used; "Ahwe", aPolynesian word, and "Galat", a Pakistani word. Both were judged to be semantically neutral by an independent sample of children. It is striking that the use of approval was statistically no better than nonsense words in promoting learning. In contrast, disapproval was highly effective in promoting learning of the discrimination and was significantly better than the "Ahwe" group ($t=5.53$ ($df,20$), $p < .001$). This modest reinforcing effectiveness of undefined praise words is corroborated by studies of Cairns (1967), Spence (1970), Hamilton (1969) and others.

Our second objective was to manipulate the cue properties of the verbal events by defining them as indicating correct or incorrect performance. The "definition" was a brief sentence at the end of the instructions and repeated after the 10th and 20th trials. For example, a child in the neutral word negative cue function group would be told, "Whenever I say the word Ahwe, it means that you have done the job wrong."

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See Figure 2

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Briefly we found that the instructional set enhanced the reinforcing effectiveness of the verbal outcome regardless of the cue function. That is, even when the cue function was opposite to its original meaning, learning occurred. So even when "Good" signalled incorrect and "Wrong" signalled correct responses, almost all the children learned the discrimination successfully. All the differences in this figure are statistically significant with the exception of the positive cue function of "Good." It is indeed striking that the effectiveness of these comments proved so susceptible to contextual definition.

In summary, the results of the experimental study show that (a) contextually undefined praise is relatively ineffective in promoting learning in the experimental setting and (b) that the cue properties of a social event can be enhanced and even reversed by a contextual definition.

Given these results, our next step was to find out how praise and criticism are used in everyday interchanges. We decided to investigate the use of social reinforcement in a normal classroom routine by detailed observational procedures. Surprisingly, there is virtually no information on the utility and functions of these events in non-experimental settings.

We used a time-sampling procedure where the experimenter observed each class for 20-30 minutes but collected data from the last ten minutes only. Two such observations were conducted in 12 primary grade classrooms. The data were recorded and categorized according to behavioral sequences which specified the initiation of the teacher-child interaction and the function of the evaluative comment. Five separate functions of the comments are represented in these sequences and we have labelled them organization, information, qualitative evaluation, query and permission. Let me briefly define each of these functions. Organization refers to verbal utterances by the teacher which are not contingent upon any child's performance. They seem like verbal placemarkers in the teacher's speech; things like, "O.K. everyone take out your workbooks." Informational uses indicate that the child has produced an objectively correct or incorrect response. For example, an informative comment would be used when a child answers a specific question correctly or incorrectly. Qualitative evaluations refer to situations where the child is praised or criticized for relative performance and there is no single objectively defined correct response. Query refers to situations where the evaluation is used as a probe for understanding, for example, "All right? O.K.?" Finally, permissional comments either grant or deny a child's request. The reliability of the positive categories - as determined by 2 raters independently viewing videotaped classes - ranged from $r$=.71 to .88.

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See Figure 3
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This histogram shows the great disparity in occurrence of positive and negative events. As you can see, positive events occurred much more frequently. This figure is based on a total occurrence of 570 evaluative expressions and the ratio of positive to negative comments was nearly 7 to 1. But not only did they occur more often, positive comments also served a greater variety of functions than negative comments.

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See Figure 4
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This illustration reveals that praise words functioned principally as organizational utterances. This means that praise words were used nearly 40% of the time in a noncontingent manner completely independent of the children's behavior. In contrast, the primary function of negative expressions was informational. Let me emphasize again that positive comments occurred more frequently, more diversely and with less contingency on children's behaviors than did negative comments. This is corroborated by a similar ethological analysis of 6 special education classrooms.

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See Figure 5
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We were really quite surprised by the close correspondence of conditional probabilities. The greater frequency and diversity of uses of positive comments does seem to be a reliable finding across different types of teachers and classes.

What does all this mean for general notions of social reinforcement? We believe there is a strong relationship between a verbal event's history of occurrence and its effectiveness as a reinforcing stimulus. The ethological analysis gives us an insight into the different informational properties of positive and negative comments. It is certainly plausible that the frequent and diverse uses of praise may reduce its stimulus discriminability. It may reduce both the children's attention to the approval events and the reliability of the signals as indicating correct performance (Cairns, 1970). This interpretation is also suggested by Hill's (1968) proposal that evaluative comments act as discriminative stimuli and secondary reinforcers. It is quite likely that the modest effects of praise in the experimental context are largely due to the proactive interference generated by the indiscriminate prior occurrence of approval words. The informational differences between praise and criticism and their different capabilities to promote learning in the experimental context are directly traceable to different informational values in their day-to-day use. Certainly, the informational properties are not the only component of the verbal comments, but they have been given far too little attention in theory and research. Indeed, what is needed is a detailed analysis of the cue properties and functions of social events in dyadic and interactive contexts. We believe the ethological research method offers the vehicle for such fine-grained analyses. It supplements the experimental perspective, affords a greater variety of interactive behaviors to investigate and generates hypotheses more immediately linked to the social behaviors we want to explain.

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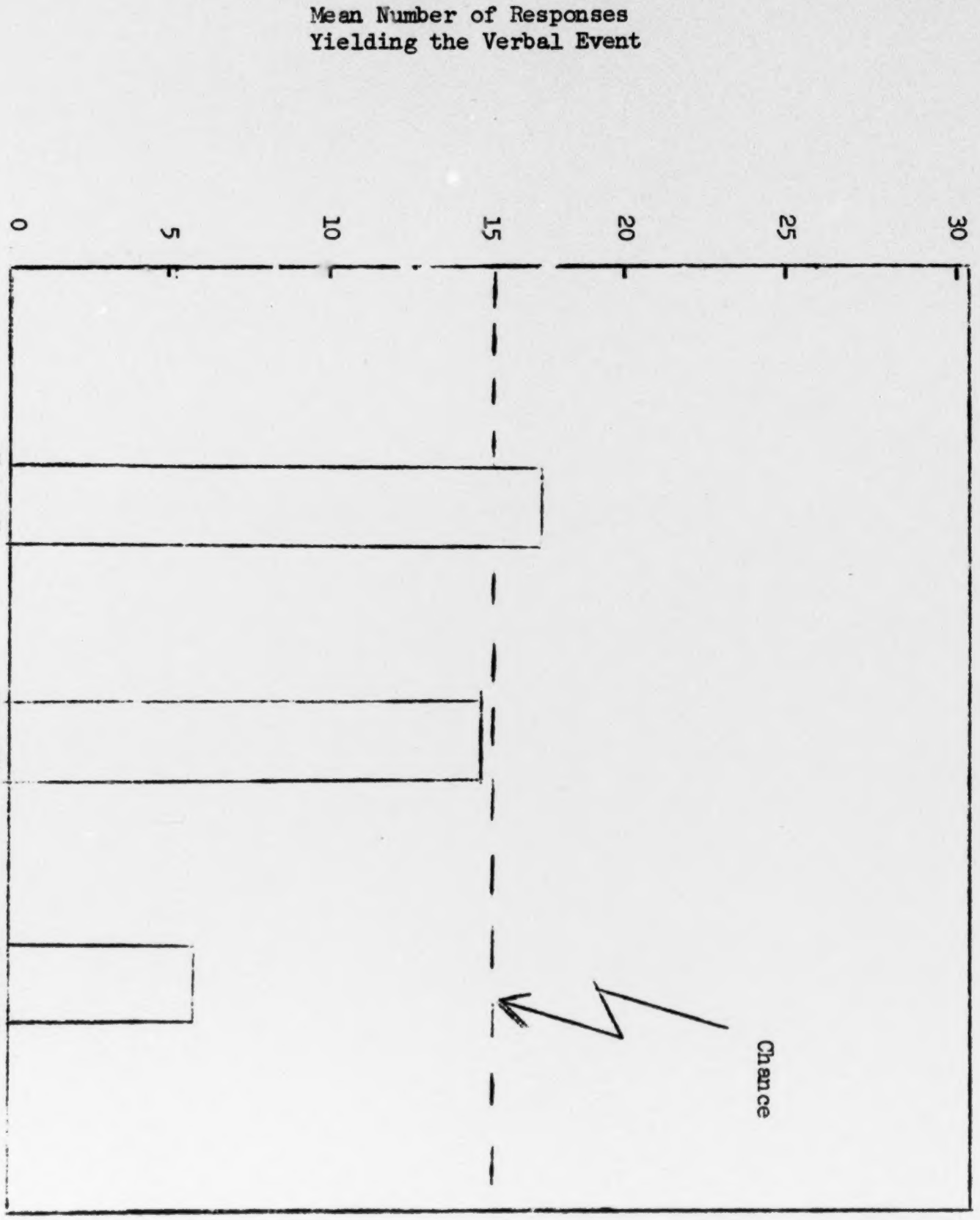
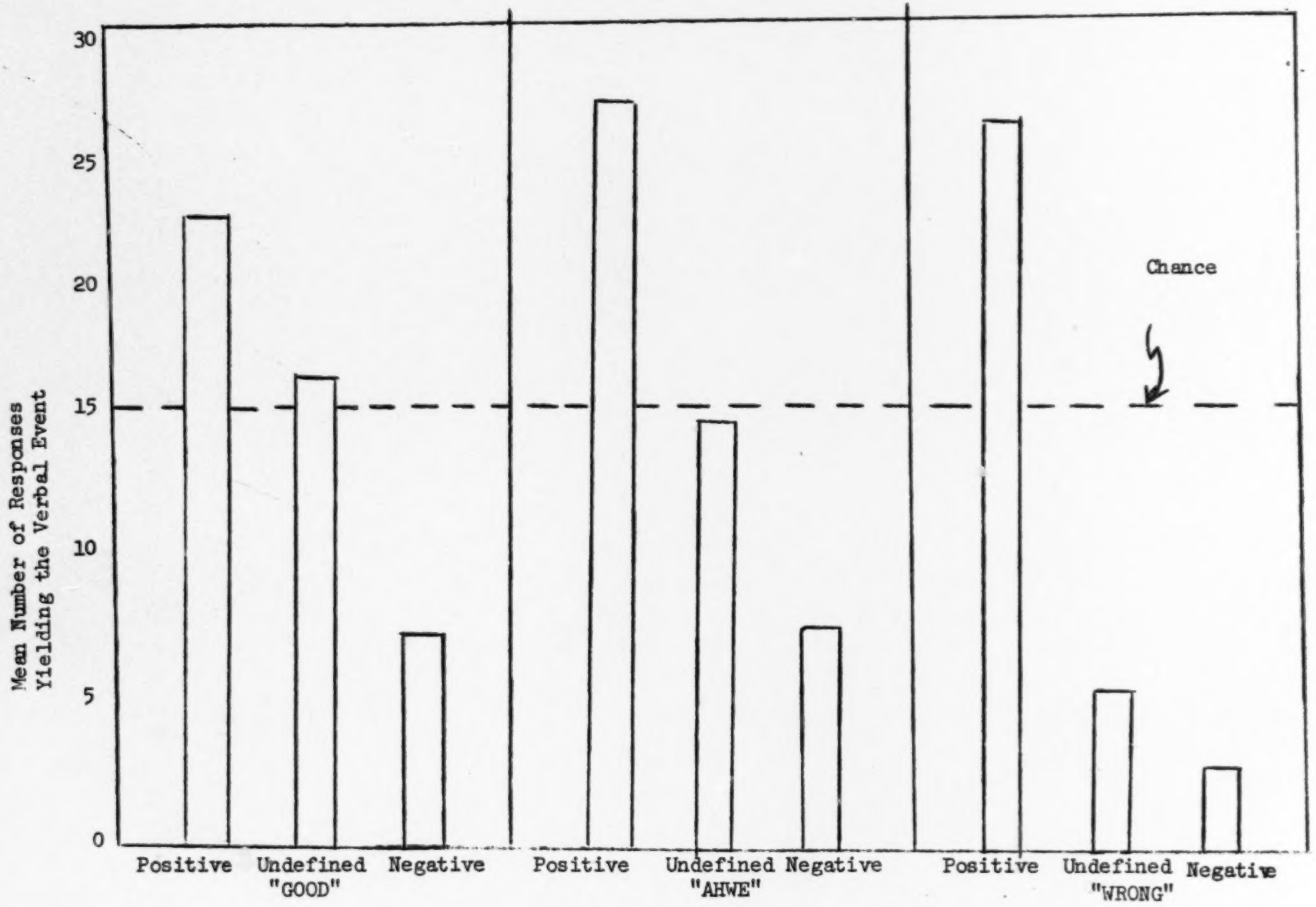

Mean Number of Responses
Yielding the Verbal Event
0
5
10
15
20
25
30
"GOOD"
"AHWE"
"WRONG"
Chance
Undefined Outcome Groups

FIGURE 1




Cue Functions of the Verbal Outcome

FIGURE 2

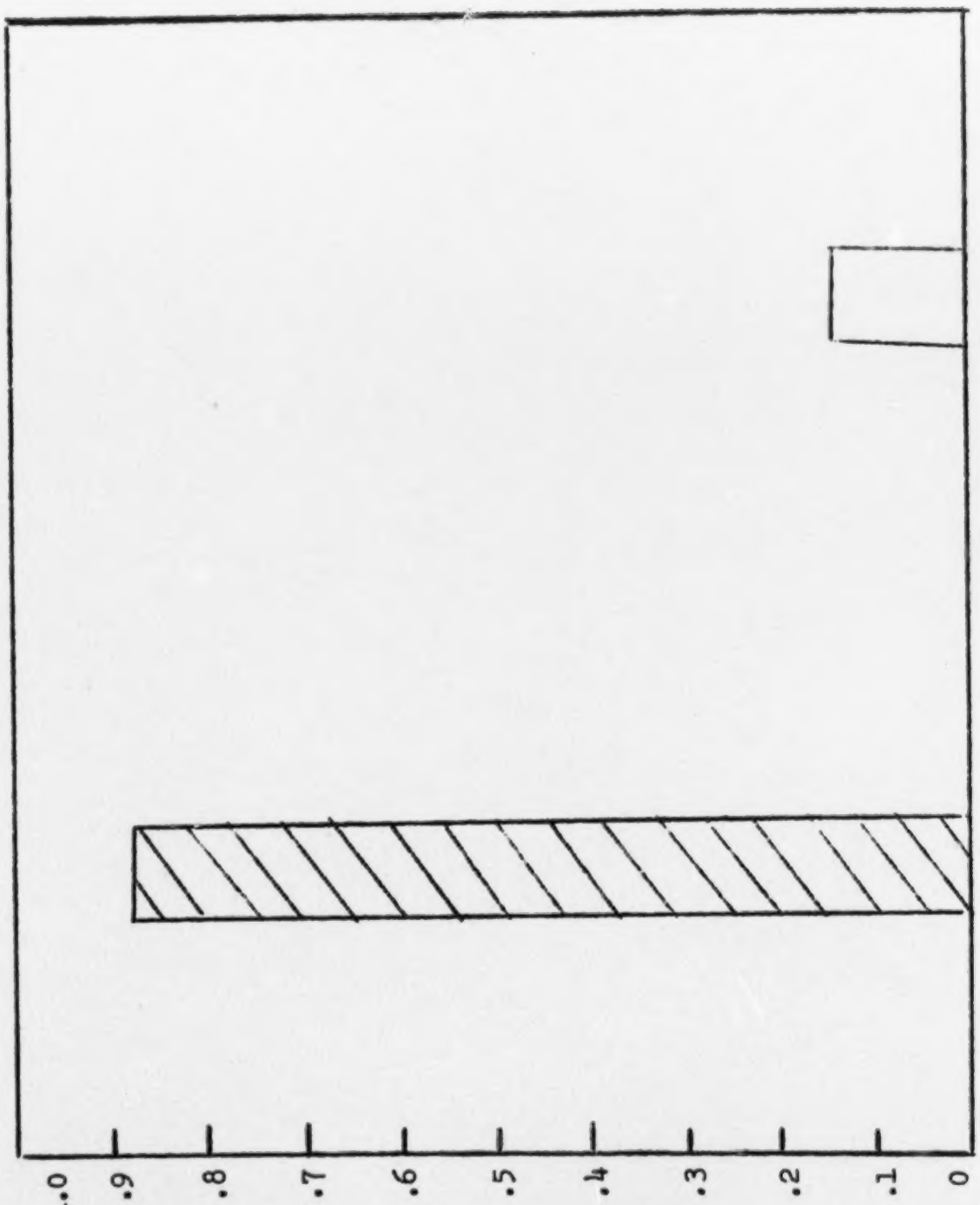

Probability of Occurrence
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
Positive
Negative
Evaluative Comments

FIGURE 3

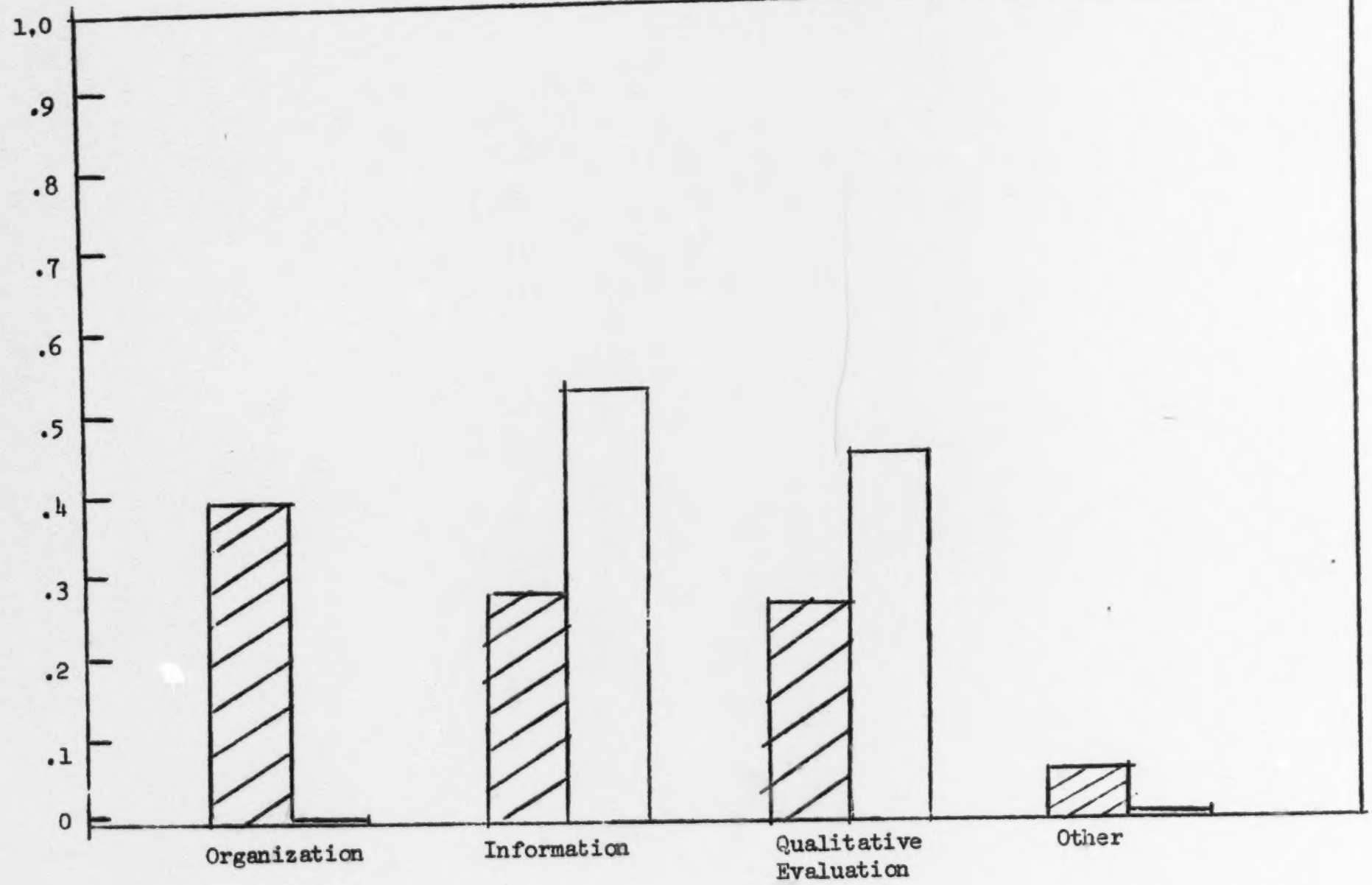

Conditional Probability of Occurrence
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
Organization
Information
Qualitative Evaluation
Other
Functions of the Evaluative Comments
= Positive
= Negative

FIGURE 4

FIGURE 5

Conditional probabilities of occurrence of positive and negative evaluative expressions for special education and regular classrooms

| Type of Verbal Event | Function of evaluation (as determined by context of teacher-child interaction) | | | | | |
|---|---|---|---|---|---|---|
| | Organizational | Informational | Qualitative Evaluation | Query | Permission | Overall Probability |
| Positive (e.g., good, right fine, OK) | .39[a] | .28 | .26 | .05 | .02 | .87 |
| | .39[b] | .28 | .27 | .04 | .03 | .89 |
| Negative (e.g., wrong, that's poor, incorrect, no good) | .00 | .53 | .46 | .01 | .00 | .13 |
| | .00 | .70 | .19 | .00 | .11 | .11 |

[a]Regular Classes

[b]Special Classes